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MEMORANDUM FOR Carolyn M. Pickering
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Subject: Nonresponse Bias Analysis for Wave 2 of the Survey of Income
and Program Participation 2014 Panel (SIPP) (ALYS-17)

This memorandum includes the documentation of the nonresponse bias analysis for Wave 2 of the 2014 Survey of Income and Program Participation (SIPP).

The U.S. Census Bureau reviewed this data product for unauthorized disclosure of confidential information and approved the disclosure avoidance practices applied to this release. CBDRB-FY20-POP001-0152.

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**Demographic Statistical Methods Division
Sample Design and Estimation**

Nonresponse Bias Analysis for Wave 2 of the 2014 Survey of Income and Program Participation (SIPP)

**Version 1.0
August 17, 2020**

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Executive Summary

The Office of Management and Budget (OMB) Standards and Guidelines for Statistical Surveys and The U.S. Census Bureau's Statistical Quality Standards require surveys to conduct a nonresponse bias analysis if unit response rates are below 80 percent (OMB, 2006; U.S. Census Bureau, 2013). This report documents the nonresponse bias analysis for Wave 2 of the 2014 Panel of the Survey of Income and Program Participation (SIPP), which covered the reference period from January to December 2014 and had a cumulative response rate of 52.3 percent. The methods implemented in this study include: comparing weighted response rates across several demographics of the SIPP sample; examining key estimates and characteristics of the full sample, responders and nonresponders using data from Wave 1 of the 2014 Panel; modelling response propensities, investigating characteristics of late responders, and benchmarking SIPP 2014 Wave 2 estimates. Our key findings are as follows:

- Weighted response rates differed significantly across subgroups and weighted response rates for various subgroups also differed from the Wave 2 response rate among Wave 1 households that were eligible for interview in Wave 2 (75.68) percent. The largest response rate differences occurred in the age of householder characteristic. Response rates in households whose householders were age 65 or older was 14.23 percentage points higher than in households whose householders were age 24 or younger.
- Wave 1 demographics, frame characteristics and SIPP key estimates significantly differed between Wave 2 respondent and nonrespondent households suggesting a high potential for nonresponse bias in Wave 2. Nonresponding households were more likely to be located outside principal cities of Core Based Statistical Areas (CBSAs), less likely participate in government welfare programs, and had younger householders.
- Relative differences between some full sample and respondent only statistics computed using data from Wave 1 of the SIPP were significantly reduced when respondent statistics were calculated using the Wave 2 noninterview adjusted weight, demonstrating noninterview adjustments were effective in reducing nonresponse bias associated with some key estimates and demographic groups in Wave 2.
- Comparing SIPP 2014 Wave 2 estimates to benchmarks revealed SIPP median income and poverty rates for calendar year 2014 computed with final weights did not differ from the same estimates published in the 2015 Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC) Current Population Reports. However, the SIPP may underestimate participation in Social Security, Medicaid, Medicare, Supplemental Nutritional Assistance Program (SNAP), and Temporary Assistance for Needy Families (TANF) but overestimate participation in Supplemental Security Income (SSI).

1. Introduction

Unit nonresponse occurs when sample units – for example households in a household survey – do not respond to a survey. Nonresponse rates have been increasing in recent years among large government surveys, creating growing concerns over data quality and the loss of valuable information from the nonrespondents. Declining response rates can indicate *nonresponse bias*, differences in survey measure estimates from the actual population values due to inherent dissimilarities between respondents and nonrespondents in the sample. However, there is not always a direct link between response rates and nonresponse bias. Different statistics within a survey can experience different degrees of nonresponse bias depending on the correlation between each statistic and a unit’s likelihood of responding. Low response rates may result in significant nonresponse bias for some statistics but not others (Groves, 2006; Groves & Peytcheva, 2008). Similarly, high response rates will not lead to a reduction in nonresponse bias if there is no association between response propensities and the variables in question.

Therefore, the degree of nonresponse bias is a function of not only the response rate, but also how much the respondents and nonrespondents differ on the survey variables of interest. For a sample mean, an estimate of the bias of the sample respondent mean is given by:

$$B(\bar{y}_r) = \bar{y}_r - \bar{y}_t = \left(\frac{n_{nr}}{n}\right) (\bar{y}_r - \bar{y}_{nr})$$

Where:

- \bar{y}_t = the mean based on all sample cases;
- \bar{y}_r = the mean based only on respondent cases;
- \bar{y}_{nr} = the mean based only on the nonrespondent cases;
- n = the number of cases in the sample; and
- n_{nr} = the number of nonrespondent cases.

Policymakers use estimates from the surveys conducted by the U.S. Census Bureau and other agencies to determine the impact of government programs and evaluate national economic indicators; therefore, understanding and measuring nonresponse bias associated with these key estimates is necessary. The Office of Management and Budget (OMB) Standards, released in 2006, require survey programs to implement a nonresponse bias analysis if unit response rates fall below 80 percent (OMB, 2006). In addition to the OMB Standards, the Census Bureau’s Statistical Quality Standards state that serious data quality issues related to nonsampling error can occur when cumulative response rates for a longitudinal survey fall below 60 percent and/or when sample attrition from one wave to the next is greater than 5 percent (U.S. Census Bureau, 2013).

1.1 Data

The SIPP is a longitudinal survey designed to collect detailed information on income, employment, health insurance, and participation in government programs among the civilian noninstitutionalized population residing in the United States. The Census Bureau employed a two-stage sample design to select the 2014 SIPP sample. Housing units in the Master Address File (MAF), which is created from the decennial censuses and frequently updated by the Census Bureau, were systematically selected from 820 Primary Sampling Units (PSUs). Selected housing units were partitioned into two strata with one containing a higher concentration of low income households than the other. Households located in the low income stratum were oversampled by 24 percent to increase the accuracy of the estimates of low income households.

Sampled households in the 2014 SIPP are interviewed annually over a period of four years and data is collected on the 12 months of the preceding calendar year. Each cycle of interview is called a *wave*. The SIPP 2014 Wave 1 interviews occurred from February through May of 2014 and obtained data on the reference period covering January 2013 through December 2013. Wave 2 interviews occurred from February through May 2015 and provided data on the 2014 calendar year. During each interview, Field Representatives (FRs) identify an adult¹ reference person, also called the *householder*, in each household. The householder is often the owner or renter of the residence.

The designated sample in Wave 1 of the 2014 SIPP consisted of approximately 53,000² households, of which 42,500 households were eligible for interview. Of the eligible households, 29,500 were interviewed resulting in a weighted response rate of 69.8 percent. Adults in *original sample* households – households that were interviewed in Wave 1 – were followed in subsequent waves and interviews were attempted for all household members, including new household members who joined a previously interviewed household. Furthermore, when persons from original sample households join a new household that was not originally in the SIPP sample, the new household – referred to as a *spawned household* – also becomes part of the SIPP sample.

In Wave 2, FRs obtained interviews from about 23,000 of the 30,000 eligible housing units, resulting in a weighted response rate of 76.7³ percent. Single wave response rates do not accurately reflect nonresponse over the course of the SIPP because it is a longitudinal survey.

¹ The SIPP defines adults as all household members age 15 or older.

² Unweighted household counts throughout this report are rounded to the nearest hundreds or thousands and may not sum up to totals or match proportions that are computed from unrounded counts.

³ The response rate of 76.7 percent is the weighted count of all interviewed households in Wave 2 divided by the weighted count of all eligible households while the response rate of 75.68 percent in the executive summary and on page 1 and used throughout the report is the weighted percentage of original sample households who were eligible for interview in Wave 2 and responded to the survey in Wave 2.

The SIPP measures cumulative sample attrition at the end of each wave using a sample loss rate given in formula 1.

Cumulative sample loss incorporates nonresponse⁴ from the beginning of the panel in Wave 1 to the end of the current wave and accounts for the unobservable loss of nonrespondent spawned households using an estimated growth factor computed from interviewed households. The cumulative sample loss rate was 31.2 percent in Wave 1 and 47.7 percent in Wave 2.

$$\text{Sample Loss} = \frac{(A_1 \times GF_c) + A_c + D_c}{I_c + (A_1 \times GF_c) + A_c + D_c} \quad 1$$

where:

- A_1 = weighted number of Type A noninterviewed households in Wave 1
- A_c = weighted number of Type A noninterviewed households in the current wave
- D_c = weighted number of Type D noninterviewed households in the current wave
- I_c = weighted number of interviewed households in the current wave
- GF_c = growth factor associated with the current wave

This report analyzes nonresponse bias in original sample households that are eligible for interview in Wave 2⁵ – hereafter referred to as original sample households or full sample households throughout the report – which were categorized as respondents or nonrespondents depending on whether FRs interviewed them in the second wave. If an original sample household is associated with one or more spawned households in Wave 2, the address where the Wave 1 reference person resides – or whose householder is a Wave 1 interviewed adult if the Wave 1 reference person is not listed on any of the household rosters in Wave 2 – is used to determine the original household’s respondent status⁶. Approximately 29,000 of the 29,500 original sample households interviewed in Wave 1 were eligible for interview in Wave 2; 22,000 were classified as respondents and the remaining 7,000 household are considered nonrespondents.

⁴ There are two types of unit nonresponse in the SIPP: Type A and Type D nonresponse. Type A nonrespondent households are eligible households where the interviewer obtains no interviews while Type D nonrespondents are previously interviewed households who move to an unknown address or moved more than 100 miles from a SIPP interviewer and no telephone interview could be conducted. As a result, Type D noninterviews only occur after Wave 1.

⁵ A previously interviewed SIPP household may become ineligible in later waves of the survey if (a) the household unit becomes vacant, demolished or otherwise unfit for residence or (b) all sample members of the household are no longer part of the SIPP sample universe, for example they become institutionalized, active military personnel or, move abroad.

⁶ All Wave 1 householders – including those that were not interviewed in Wave 2 – were listed in Wave 2 household rosters.

1.2 Nonresponse Bias in Previous Panels

Previous efforts to examine nonresponse bias and determine its impact on SIPP estimates involved comparing frame variables and data available from previous interviews between respondent households and households who were nonrespondents in the first or later waves of the survey. SIPP estimates from previous panels were also compared to benchmarks – official statistics computed from administrative records or surveys and available to the public – to assess the likelihood of nonresponse bias.

Nonresponse bias analysis on Wave 1 of the 2008 Panel suggested that the SIPP was underestimating participation in the Supplemental Nutrition Assistance Program (SNAP), Supplemental Security Income (SSI), Medicaid, and Medicare compared to administrative data sources. Comparing different subgroups in the sample further revealed differences in response rates related to race, region, and urban/rural status frame variables.

Households with Black householders had lower response rates than household whose householders were of a different race, and households in rural areas had higher response rates than those in urban area. Comparing estimates of the frame variables between the full sample and the respondent sample found differences for region, urban/rural status, MSA type, and race. These results were supported by odds ratios from a logistic regression analysis indicating region, household size, and age of householder significantly affected response propensities. However, weighting adjustments resulted in reduction of bias associated with these variables (Treat, 2015).

Analysis on Wave 2 and later waves of the 2008 SIPP Panel comparing estimates of the full sample and the respondent sample suggested that SIPP may be overestimating household income, household earnings, and participation in Medicare and Social Security, but underestimating enrollment in Medicaid and SNAP. Relative differences between full sample and respondent estimates increased in later waves as sample loss increased. However, the representativity indicator (R-indicator), a measure of similarity between the sample and the population, remained above 70 percent for each wave, indicating the respondent sample is likely representative of the full sample and thus the population (Treat, 2015).

The SIPP 2014 Wave 1 nonresponse bias analysis results were consistent with findings from previous panels indicating the SIPP underestimated participation in government programs. The study also found that response rates differed between various subgroups of the selected sample. FRs were most likely to interview households located in the Midwest compared to other regions and households in the low income stratum were more likely to be respondents than those in the non-low income stratum. Furthermore, the distribution of household size, householder race, and sex differed between all selected eligible households and Wave 1 respondents, but the bias was mitigated when nonresponse adjusted weights were used in computing most of these statistics (Treat, 2017).

2. Methodology

Six methods were used to investigate nonresponse bias in Wave 2 of the 2014 SIPP, most of which were utilized in assessing nonresponse bias in later waves of the 2008 SIPP panel. The techniques analyze a combination of geographic frame variables, Wave 1 data available for both respondents and nonrespondents, Wave 2 data available for respondents only, and external benchmarks. They include:

1. Comparing single wave response rates across subgroups of the sample to the overall single wave response rate in Wave 2.
2. Comparing Wave 1 household characteristics and SIPP key estimates between Wave 2 respondent and nonrespondent households.
3. Comparing Wave 1 household characteristics and SIPP key estimates between the original sample households interviewed in Wave 1 and the Wave 2 respondent sample.
4. Modelling Wave 2 response propensities using logistic regression.
5. Level of effort analysis comparing SIPP Wave 2 key estimates between early and late responding households.
6. Benchmark analysis comparing SIPP Wave 2 key estimates to available corresponding administrative data statistics and estimates from other surveys.

2.1 Weighting Procedure

SIPP sample households – and therefore sample persons – are selected with unequal probabilities. Appropriate weights, estimates of the number of households (persons) each sample household (person) represents in the population, should be used when computing SIPP estimates to account for the survey's sample design.

All sampled households were assigned base weights (BW) equal to the inverse of their selection probabilities at the beginning of the panel. Base weights were adjusted for additional subsampling done in the field and nonresponse during Wave 1 interviews using Weighting control Factors (WCF) and Wave 1 noninterview adjustment factors ($W1_{af}$) respectively, to create Wave 1 household noninterview adjusted weights ($W1_{NIwgt}$). The household noninterview weights were then assigned to each member of the household, and raked to independent population controls for each month in the wave to determine monthly final person weights ($PFINWGT$) in Wave 1.

Each eligible household in subsequent waves, #, was assigned an initial weight ($W\#_{INITwgt}$) equal to its Wave 1 noninterview adjusted weight. Initial weights are multiplied by movers' adjustment factors ($W2_{MF}$) to account for multiple chances of selection of movers⁷. The resulting movers' weights are multiplied by a noninterview adjustment factor $W\#_{af}$ to obtain

⁷ Movers – persons who move into SIPP sample households after Wave 1 interviews – have two chances to become SIPP sample persons: (a) selection into original SIPP sample households in Wave 1 or (b) selection by moving into a sample household after Wave 1.

household noninterview adjusted weights for the current wave. Finally, the household noninterview weights are assigned to all occupants of the household and raked to monthly population controls to determine the person weights for each month. Details of the SIPP cross-sectional weighting procedure are outlined in Treat (2017) and Tersine (2020).

Wave 2 household initial weights ($W2_{INITwgt}$)⁸, household noninterview adjusted weights ($W2_{NIwgt}$), and final person weights ($PFINWGT$) are used for the analyses in this report and computed as follows:

$$\begin{aligned} W2_{INITwgt} &= W1_{NIwgt} = BW * WCF * W1_{af} \\ W2_{NIwgt} &= W2_{INITwgt} * W2_{MF} * W2_{af} \\ W2_{PFINWGT}^9 &= W2_{NIwgt} * W2_{SS_{af}} \end{aligned}$$

$W2_{SS_{af}}$ are second stage adjustment factors computed during the raking to population controls step of the weighting procedure. All analyses were conducted using survey procedures in SAS[®] software and hypothesis testing was carried out at the 90 percent confidence level.

2.2 Analytic Variables

We evaluated nonresponse bias associated with SIPP key estimates including household earned income, total income, net worth, poverty rates, and participation in government programs. Estimates of nonresponse bias can only be produced for variables that are available for both respondents and nonrespondents. Due to the longitudinal structure of the SIPP, calendar year 2013 data obtained during Wave 1 interviews is available for Wave 2 respondents and nonrespondents, and utilized to assess the potential for nonresponse bias.

The SIPP key estimates¹⁰ examined in this analysis include:

- *Median annual household earnings*
- *Median annual household total income*
- *Median household net worth*
- *Household annual poverty rates*
- *Percent of households where at least one household member was covered by Medicaid*
- *Percent of households where at least one household member was covered by Medicare*

⁸ A household's Wave 2 initial weight is equal to its Wave 1 noninterview adjusted weight. As a result, statistics that are computed with the Wave 2 initial weight are adjusted for Wave 1 nonresponse.

⁹ Previous SIPP Panels published person, family, and household level final weights with cross-sectional public use files. The SIPP 2014 Panel however, only published final person weights. Household weights can be created by either using the final weights of the householder or averaging the final weights of all persons in the households; we use the first method to compute all final weighted household level estimates in Section 4.6 of this report.

¹⁰ The SIPP cross-sectional data files contains monthly and annual coverage indicator variables for most programs and topics collected during interview. We use the annual coverage indicators to determine programs' recipients in this report unless otherwise noted.

- *Percent of households where at least one household member received Social Security income*
- *Percent of households where at least one household member received Supplemental Security Income (SSI)*
- *Percent of households where at least one household member received Supplemental Nutrition and Assistance Program (SNAP) benefits*
- *Percent of households where at least one household member received Temporary Assistance for Needy Families (TANF) benefits*
- *Percent of households receiving welfare income i.e., households where at least one household member participated in or received income from one of the following sources: Medicaid, SNAP, SSI, General Assistance, TANF, or Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)*

Table 1 lists Wave 1 demographic variables and geographic sampling frame variables that are also available for both respondents and nonrespondents and are included in our analyses. Some of these variables were used in Wave 1 and/or Wave 2 household noninterview adjustment. Approximately 200 households had missing Core Based Statistical Area (CBSA) values and 250 households had missing Urban/Rural Status values. These households were excluded when computing estimates that utilized CBSA or Urban Rural Status, including unit response rates and proportions of households for each level of the variables.

Table 1. Characteristics and Geographic Frame Variables Used to Assess Nonresponse Bias

Variable/Characteristics	Level Definitions
<i>Age of Householder</i>	Under 25 years 25 to 34 years 35 to 44 years 45 to 54 years 55 to 64 years 65 years or older [†]
<i>Assets[^]</i>	Bonds – at least one household member possessed one of the following assets: U.S. Government savings bonds or securities, money market deposit accounts, certificates of deposit, mutual funds, stocks, rental properties, municipal or corporate bonds, other investments. Minimal – No one in household possessed any of the above assets.
<i>Core Based Statistical Area (CBSA) status[^]</i>	In principal city of a Core Based Statistical Area (CBSA) In CBSA but not in principal city Outside a CBSA or principal city
<i>Census Region[^]</i>	Northeast Midwest South West

Variable/Characteristics	Level Definitions
<i>Educational Attainment of Householder*</i>	Up to high school diploma Some college, no bachelor's degree Bachelor's degree or higher
<i>Hispanic Origin of Householder*</i>	Hispanic, Non-Hispanic
<i>Household Income to Poverty Ratio*</i>	Less than 1.75 1.75 to 4.5 Greater than 4.5
<i>Household Size^{^*}</i>	1 person household 2 person household 3 person household 4 or more person household
<i>Household Type*</i>	Female householder with biological child and no spouse present. Householder age 65 years or older [‡] Other
<i>Marital Status of Householder*</i>	Married, spouse present Married, spouse absent Widowed Divorced Separated Never married
<i>Race of Householder^{^*}</i>	White only Black only Asian only Other
<i>Sex of Householder</i>	Male Female
<i>Tenure^{^*}</i>	Owner Renter, no government subsidy Renter, receives government subsidy
<i>Urban/Rural Status</i>	Household located in urban area Household located in rural area
<i>Within PSU Strata[^]</i>	Low income stratum Non-low income stratum

Source: U.S. Census Bureau, Survey of Income and Program Participation (SIPP), 2014 Panel. For more information on sampling and nonsampling error, see the SIPP 2014 User's Guide.

[^] Variables were used in computing Wave 1 noninterview adjustment factors.

^{*} Variables were used in computing Wave 2 noninterview adjustment factors.

[‡] Estimates of the last category of the *Age of Householder* variable and the second category of the *Household Type* variable represent the same statistic: households whose householders were age 65 years or older.

The relationship between the demographic and sampling frame variables above and SIPP key estimates were examined using the Rao-Scott chi-square test of association. Most of the demographics and geographic variables were significantly associated with the key estimates.

2.3 Examining Weighted Unit Response Rates in Subgroups of the Original Sample Households Eligible for Interview in Wave 2

Weighted unit response rates were calculated using Wave 2 initial weights for different subgroups of the original sample households interviewed in Wave 1 and compared to the total weighted unit response rate of 75.68 percent for Wave 2 of the SIPP 2014 Panel. Pairwise comparisons of response rates across subgroups within the same demographic or geographic characteristic were also done and Bonferroni correction was used to adjust for the multiple comparisons. Response rates were calculated using formula 2 below.

$$\text{Response Rate} = \frac{\sum_{i \in S} w_i R_i D_i}{\sum_{i \in S} w_i D_i} \quad 2$$

where:

i = indicator for each original sample household

S = set of all original sample households

w_i = Wave 2 initial weight of the i^{th} household

R_i = response indicator

D_i = domain indicator

Dissimilar response rates among subgroups within the same characteristics indicate a potential for nonresponse bias. Subgroups with lower response rates compared to the other subgroups of the same variable may be underrepresented in the final sample and subgroups with high response rates compared to the other subgroups of the same variable may be overrepresented in the survey. Fay's modified Balanced Repeated Replication (BRR) was used to estimate the standard error of the difference between weighted unit response rates for each subgroup and the total unit response rate (Fay, 1984).

2.4 Comparing Key Estimates, Demographic Characteristics, and Frame Variables Between Wave 2 Respondent and Nonrespondent Households

SIPP calendar year 2013 key estimates described in Section 2.2, including household earned income, total income, net worth, poverty rates, and program participation rates, were computed from Wave 1 data and compared between respondent and nonrespondent households. We also examined the distribution of demographic and sampling geographic variables between the two respondent groups using Rao-Scott chi-squared test of association. All estimates and their standard errors were calculated using Wave 2 initial weights and replicate weights respectively. While differing response rates indicate which demographic variables may be associated with nonresponse bias, the difference between estimates

computed from respondents and nonrespondents is a direct approximation of nonresponse bias which occurs when respondent and nonrespondent sample units within a survey differ with respect to survey variables (Groves, 2006).

2.5 Comparing Key Estimates and Characteristics of the Full Sample to the Respondent Sample

We examined calendar year 2013 SIPP key estimates, as well as the distribution of geographic and householder demographic variables among original sample households eligible for interview in Wave 2, and among the Wave 2 respondent sample. The estimates derived from the full sample were weighted using Wave 2 initial weights, which incorporates unit nonresponse from Wave 1 while the respondent sample estimates were computed using both Wave 2 initial and noninterview adjusted weights respectively. Fay's modified BRR was used to estimate the standard error of the differences between full sample and respondent estimates.

The difference between the respondent statistics obtained using the initial weights and the full sample statistic for each variable is an estimate of nonresponse bias. Whereas the difference between the respondent statistics obtained with nonresponse adjusted weights and the respondent statistics obtained with initial weights is reflective of the effects of nonresponse weighting adjustments on the bias.

2.6 Modeling Wave 2 Response Propensities

A weighted logistic regression model was used to predict the likelihood of a household interviewed in Wave 1 responding in Wave 2. Wave 1 demographic variables and geographic variables significantly associated with nonresponse in earlier methods were used as predictors in the model which is of the form

$$\text{logit}(\pi) = \log\left(\frac{\pi}{1-\pi}\right) = X\beta$$

where X is a vector of the explanatory variables, π is the probability of an original sample household responding in Wave 2 and β is the vector of slope parameters associated with explanatory variables.

The logistic regression was implemented using the SURVEYLOGISTIC procedure in SAS, and incorporated Wave 2 initial weights and replicate initial weights to adjust for the SIPP's sample design. Odds ratios produced by the model indicate which subgroups of the sample are more or less likely to be interviewed.

The predicted response propensities from the logistic regression model were also used to calculate an R-indicator, which measures how representative a survey's respondents are of the full sample and hence, the population (Schouten et al., 2009). The R-indicator is estimated by

the following equation below and its confidence interval is constructed using Fay's modified BRR.

$$\hat{R} = 1 - 2S_{\hat{p}} = 1 - 2 \sqrt{\frac{1}{\sum_{i=1}^{29,500} w_i - 1} \sum_{i=1}^{29,500} w_i (\hat{p}_i - \bar{\hat{p}})^2}$$

where w_i is the Wave 2 initial weight and \hat{p}_i is the response propensity estimated by the logistic regression model.

The value of the R-indicator approaches 1 when the standard deviation of the response propensities is small, i.e. when the response propensities are similar, indicating the respondents are more likely to be representative of the sample. Conversely, an R-indicator with value close to 0 indicates inadequate representativeness or large differences between the respondents and nonrespondents.

2.7 Level of Effort

Our level of effort analysis explored differences in the characteristics and key estimates of early and late responder households. Timeliness in responding to the survey was quantified by the number of contacts from an FR a household required to complete the interview during the data collection period.

The distribution of the number of contacts for all original sample households that responded in Wave 2 was examined and a cutoff point of 6 contacts, the 75th percentile, was used to define level of effort exerted by FRs during the interview period. Respondent households requiring fewer than 6 contacts to complete the interview were considered early responders while those requiring 6 or more contacts to complete the interviews were designated late responders. SIPP calendar year 2014 key estimates were calculated using Wave 2 data and Wave 2 initial weights for both sets of responders. If late responders are assumed to be similar to nonresponders, then significant differences between early and late responder estimates are indicative of nonresponse bias.

2.8 Benchmarking Wave 2 Key Estimates

We computed person and household level monthly, average monthly, and calendar year estimates using Wave 2 data for all households that were interviewed in Wave 2 – including original sample households and all spawned households – and compared them to corresponding benchmark values. The methods and key estimates discussed in Sections 2.3 to 2.7 were calculated from original sample households and only included spawned households containing an original sample householder as described in Section 1.1. The benchmarking analysis includes data from all households interviewed in Wave 2 regardless of whether they

were interviewed in Wave 1. It also accounts for item level nonresponse in Wave 2 by incorporating post-interview item imputed responses for survey measures that interviewed persons did not provide¹¹.

SIPP estimates of monthly program participation counts in December 2014 were compared to monthly counts of programs' enrollees published by The Centers for Medicare and Medicaid Services (*Medicaid, Medicare*¹²), United States Department of Agriculture (*SNAP*), United States Department of Health and Human Services (*TANF*), and the Social Security Administration (*SSI, Social Security*). Average monthly Social Security and SSI income in December 2014 were computed from the SIPP and compared to those published in the 2015 Social Security Annual Statistical Supplement. Annual median income and poverty rates computed from all Wave 2 interviewed households were compared to 2014 annual median income and poverty rates from the 2015 Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC), the official source of poverty estimates for the United States.

The SIPP estimates were calculated using final weights that are adjusted for nonresponse, and raked to population control totals. Standard errors of the estimates were calculated using Fay's method of BRR and t-tests were used to test for significant differences between SIPP estimates and benchmark statistics. Significant differences between the two values for any statistic may suggest that the SIPP underestimates or overestimates that statistic.

3. Assumptions and Limitations

Most of the methods in our analysis exclude spawned households without an original sample household reference person. As a result, the Wave 2 noninterview adjusted weights for these households and persons residing in them are not accounted for. We also do not account for changes in household composition between interview periods. The demographic variables used, including age, sex, Hispanic origin, educational level, householder type, race, and marital status belong to the household reference person in the first wave and household compositions and reference persons may change between waves. As a result, the actual difference between full sample and respondent estimates may slightly differ from the values we computed. The benchmark analysis attempts to compensate for this as it includes all households interviewed in the current wave and also utilizes demographic variables and key estimates from the current wave.

¹¹ Chapter 6 of the SIPP Users' Guide provides more details on the imputation methods for item nonresponse in the SIPP.

¹² Medicare SIPP estimate and benchmarks were average monthly enrollments over the course of calendar year 2014.

4. Results

4.1 Weighted Unit Response Rates in Subgroups of the Original Sample Household Eligible for Interview in Wave 2

Table 2 summarizes the results of comparing Wave 2 cross-sectional response rates in different subgroups of the sample. The second through fifth columns show the unweighted and weighted household counts in each subgroup, weighted response rates, and their corresponding standard errors respectively. The sixth column displays results of Bonferroni adjusted multiple pairwise comparisons across subgroups within the same characteristics. Response rates from subgroups with the same letters are not significantly different from each other. The last column indicates whether a subgroup's response rate is significantly different from the overall response rate of 75.68 percent.

Response rates in most subgroups, except for those of race, Hispanic origin and sex of reference person, significantly differ from the overall response rate. The highest difference in response rate is 8.90 percentage points; the difference between overall response rate (75.68 percent) and response rate in households with reference persons age 24 or younger (66.78 percent). This suggests that households with householders in the lowest age group category are underrepresented in the respondent sample.

Other subgroups with response rates lower than 75.68 percent and may be underrepresented in the respondent sample include: households with reference persons age 54 or younger; households with female householders that have biological children and no spouse present; households who rented their homes but received no government subsidy; households consisting of three or more persons.

On the other hand, households whose reference person were age 55 or older had higher response rates than the overall sample, suggesting they may be overrepresented in Wave 2 of the SIPP. Households that: were located outside of CBSAs; consisted of only one person; owned their homes or rented their homes and received government subsidies also had response rates significantly higher than 75.68 percent and may also be overrepresented in the second wave of the 2014 SIPP.

Age of householder had the highest variation in subgroup response rates per multiple pairwise comparison results. Households with reference persons age 65 or older are overrepresented in the respondent sample compared to household with reference persons in the other age categories. The response rate from households whose householders were age 65 or older was 14.23 percentage points higher than response rate in the lowest age category, households with reference persons age 24 or younger.

Households located in the South had higher response rate (76.38 percent) than those located in the Northeast census region (73.89 percent). However, neither region's response rates differed

significantly from those of households located in the West. The response rate among households located in the Midwest (76.12 percent) was also higher than that of households located in the Northeast, but was not significantly different from response rates of households located in the South or West. All pairwise comparisons of subgroups within race, Hispanic origin and sex of householder variables were also not significantly different from each other.

Table 2. SIPP 2014 Wave 2 Weighted Response Rates for Different Subgroups of the Original Sample Households Interviewed in Wave 1

Characteristic	Unweighted ¹ Households	Weighted ¹ Households (in thousands)	Weighted Response Rate (percent)	Standard Error (percent)	Significance Grouping [‡]	
Total	29,000	110,800	75.68	0.28	-	
Age of Householder						
Under 25 years	1,500	5,112	66.78	1.39	A	*
25 to 34 years	4,200	15,740	71.28	0.82	B	*
35 to 44 years	4,900	18,300	73.57	0.77	B,C	*
45 to 54 years	5,600	21,510	74.49	0.55	C	*
55 to 64 years	5,700	21,940	77.00	0.61	D	*
65 years or older	7,200	28,220	81.01	0.49	E	*
Census Region						
Northeast	3,800	20,170	73.89	0.54	A	*
Midwest	6,500	24,980	76.12	0.63	B	
South	13,000	41,040	76.38	0.45	B	*
West	5,900	24,630	75.55	0.60	A,B	
Core Based Statistical Area (CBSA) Status						
Inside principal city of a CBSA	9,500	36,670	76.34	0.51	A	
In CBSA but not principal city	13,500	56,580	74.24	0.38	B	*
Not in a CBSA	5,900	16,810	79.21	0.69	C	*
Educational Attainment of Householder						
Up to high school diploma	12,500	42,760	76.80	0.46	A	*
Some college, no bachelor's degree	8,600	31,990	73.20	0.49	B	*
Bachelor's degree or higher	8,300	36,070	76.57	0.47	A	*
Sex of Householder						
Male	13,500	52,590	75.83	0.36	A	
Female	15,500	58,230	75.55	0.41	A	
Hispanic Origin of Householder						
Hispanic	3,600	13,630	75.13	0.84	A	
Non-Hispanic	25,500	97,190	75.76	0.27	A	
Household Size						
1 person household	8,500	30,840	79.38	0.52	A	*

Characteristic	Unweighted ¹ Households	Weighted ¹ Households (in thousands)	Weighted Response Rate (percent)	Standard Error (percent)	Significance Grouping [‡]	
2 person household	9,600	39,250	75.03	0.50	B	
3 person household	4,500	16,650	74.07	0.78	B,C	*
4 or more person household	6,600	24,080	73.14	0.61	C	*
Household Type						
Female householder with biological child and no spouse present	1,900	6,487	70.05	1.13	A	*
Householder 65 years or older	7,200	28,220	81.01	0.49	B	*
Other	20,000	76,120	74.19	0.35	C	*
Marital Status of Householder						
Married, spouse present	13,500	53,610	74.61	0.36	A	*
Married, spouse absent	500	1,947	76.18	1.97	A,B,D	
Widowed	3,000	10,710	83.30	0.73	C	*
Divorced	5,100	18,900	77.26	0.71	D	*
Separated	900	3,047	76.95	1.69	A,B,D	
Never married	6,200	22,610	73.07	0.60	B	*
Race of Householder						
White Only	23,000	89,700	75.72	0.31	A	
Black Only	4,400	13,210	74.74	0.66	A	
Asian Only	1,000	4,917	77.00	1.31	A	
Other	850	2,997	76.68	1.77	A	
Tenure						
Owner	18,500	71,570	76.38	0.35	A	*
Renter, no government subsidy	9,300	34,120	73.32	0.55	B	*
Renter, receives government subsidy	1,500	5,135	81.76	1.05	C	*
Urban/Rural Status						
Urban	22,500	88,790	75.25	0.30	A	*
Rural	6,600	21,150	77.50	0.59	B	*
Within PSU Strata						
Low income	14,500	40,630	77.49	0.40	A	*
Non-low income	14,500	70,200	74.64	0.39	B	*

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2014 Panel.

¹ Sums may not add up to total due to rounding.

[‡] Response rates of subgroups within the same characteristic with same letters are not significantly different from each other at the $\alpha=0.10$ level.

* Indicates subgroup response rate is significantly different from overall response rate at the $\alpha=0.10$ level.

4.2 Comparing Key Estimates and Characteristics Between Wave 2 Respondent and Nonrespondent Households

Table 3 shows results from comparing respondent and nonrespondent households' key estimates and the distribution of demographic and frame variables derived from SIPP 2014 Wave 1 data using Wave 2 initial weights. Nonrespondent households had higher median annual earned and total income of \$41,720 and \$54,870 respectively in 2013, compared to respondent households whose median household earnings and total income were \$32,660 and \$50,130. This findings suggests the presence of nonresponse bias and that the SIPP may underestimate household earnings and income in Wave 2. However, median household net worth did not significantly differ between the two groups.

Household poverty rates also did not significantly differ by response status but respondent households had lower income to poverty ratio and were more likely to receive income from or participate in most government programs during the 2013 calendar year. Approximately 34.1 percent of respondent households had at least one person receiving Social Security benefits compared to 25.54 percent Social Security enrollment rates in nonrespondent households. Additionally, respondent households had higher participation rates in Medicaid, Medicare, SNAP, and SSI.

The distribution of demographic and geographic variables also differed significantly between the two groups except for householder race, Hispanic origin and sex. Householders in respondent households were generally older than those in nonrespondent households; more than 25 percent of respondent householders were age 65 years or older compared to 20 percent of nonrespondent householders. Respondent households were also more likely to be in the low income stratum compared to nonrespondent households, consistent with their higher participation rates in government programs.

Table 3: Comparison of Estimates between Wave 2 Respondents and Nonrespondents

Characteristics and Key Estimates	Respondents		Nonrespondents		Chi-Square Statistic (df)	
	Percent/ Median in Dollars	Standard Error	Percent/ Median in Dollars	Standard Error		
Annual household earnings	32,660	551	41,720	1,049	-	*
Annual household income	50,130	417	54,870	929	-	*
Household net worth	88,000	1,875	85,790	4,047	-	
Households in poverty	13.78	0.27	13.55	0.46	-	
Households receiving income from welfare programs	24.70	0.30	21.79	0.45	-	*
Program Participation						
Medicaid	19.75	0.26	17.54	0.43	-	*
Medicare	33.68	0.32	24.93	0.57	-	*

Characteristics and Key Estimates	Respondents		Nonrespondents		Chi-Square Statistic (df)	
	Percent/ Median in Dollars	Standard Error	Percent/ Median in Dollars	Standard Error		
Supplemental Nutritional Assistance Program (SNAP)	13.97	0.23	12.12	0.36	-	*
Social Security	34.10	0.31	25.54	0.52	-	*
Supplemental Security Income (SSI)	5.83	0.16	4.31	0.23	-	*
Temporary Assistance for Needy Families (TANF)	0.93	0.07	0.98	0.11	-	
Asset Ownership						
Bonds	36.00	0.34	33.19	0.67	14.98(1)	*
Minimal	64.00	0.34	66.81	0.67		
Age of Householder						
Under 25 years	4.07	0.16	6.30	0.32	196.5(5)	*
25 to 34 years	13.38	0.24	16.78	0.52		
35 to 44 years	16.05	0.29	17.95	0.50		
45 to 54 years	19.10	0.26	20.36	0.44		
55 to 64 years	20.14	0.28	18.72	0.54		
65 years or older	27.25	0.29	19.89	0.53		
Census Region						
Northeast	17.77	0.15	19.53	0.41	10.92(3)	*
Midwest	22.68	0.19	22.14	0.53		
South	37.37	0.20	35.98	0.54		
West	22.19	0.20	22.35	0.51		
Core Based Statistical Area (CBSA) Status						
Inside principal city of a CBSA	33.60	0.34	32.44	0.65	38.28(2)	*
In CBSA but not principal city	50.41	0.43	54.49	0.71		
Not in a CBSA	15.98	0.42	13.07	0.53		
Educational Attainment of Householder						
Up to high school diploma	39.16	0.34	36.82	0.66	34.24(2)	*
Some college, no bachelor's degree	27.92	0.31	31.82	0.57		
Bachelor's degree or higher	32.92	0.29	31.36	0.67		
Hispanic Origin of Householder						
Hispanic	12.21	0.20	12.58	0.42	0.5625(1)	
Non-Hispanic	87.79	0.20	87.42	0.42		
Household Income to Poverty Ratio						
Less than 1.75	27.44	0.30	25.57	0.55	17.54(2)	*
1.75 to 4.5	39.93	0.38	38.87	0.63		
Greater than 4.5	32.63	0.36	35.56	0.60		
Household Size						
1 person household	29.18	0.27	23.60	0.59	68.56(3)	*
2 person household	35.11	0.33	36.37	0.67		

Characteristics and Key Estimates	Respondents		Nonrespondents		Chi-Square Statistic (df)	
	Percent/ Median in Dollars	Standard Error	Percent/ Median in Dollars	Standard Error		
3 person household	14.71	0.26	16.02	0.45		
4 or more person household	21.00	0.26	24.00	0.57		
Household Type						
Female householder with biological child and no spouse present	5.42	0.14	7.21	0.31	152.8(2)	*
Householder 65 years or older	27.25	0.29	19.89	0.53		
Other	67.33	0.30	72.90	0.61		
Marital Status of Householder						
Married, spouse present	47.69	0.32	50.50	0.57	117.2(5)	*
Married, spouse absent	1.77	0.08	1.72	0.17		
Widowed	10.64	0.22	6.64	0.31		
Divorced	17.41	0.28	15.95	0.56		
Separated	2.80	0.11	2.61	0.23		
Never married	19.70	0.29	22.59	0.48		
Race of Householder						
White Only	80.97	0.24	80.83	0.50	2.862(3)	
Black Only	11.77	0.17	12.38	0.35		
Asian Only	4.51	0.14	4.20	0.29		
Other	2.74	0.13	2.59	0.22		
Sex of Householder						
Male	47.55	0.39	47.16	0.66	0.2677(1)	
Female	52.45	0.39	52.84	0.66		
Tenure						
Owner	65.17	0.26	62.74	0.64	49.58(2)	*
Renter, no government subsidy	29.83	0.28	33.78	0.62		
Renter, receives government subsidy	5.01	0.14	3.48	0.23		
Urban/Rural Status						
Urban	80.30	0.29	82.20	0.50	11.57(1)	*
Rural	19.70	0.29	17.80	0.50		
Within PSU Strata						
Low income	37.53	0.27	33.94	0.57	23.53(1)	*
Non-low income	62.47	0.27	66.06	0.57		

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2014 Panel.

* Indicates respondent and nonrespondent estimates are significantly different at the $\alpha=0.10$ level.

4.3 Comparing Key Estimates and Characteristics between the Full Sample and the Respondent Sample

Relative differences between calendar year 2013 estimates computed from all original sample households interviewed in Wave 1 and from original sample households that responded to the survey in Wave 2 are presented in Table 4. All estimates from the full sample were computed using Wave 2 initial weights while the estimates for the respondent sample were weighted using both Wave 2 initial weights, as well as, nonresponse adjusted weights.

The relative difference for an estimate i , is calculated as $100 * (R_i - F_i)/F_i$ where F_i is the value of estimate obtained from the full sample and R_i is the value of the estimate obtained from the respondent sample. Relative differences between the initial weighted estimates from both samples – column six – are estimates of nonresponse bias. Comparing them with relative differences computed from Wave 2 noninterview weighted respondent estimates – the ninth column – gives insight on the effect of the adjustments on the bias.

In 2013, the median household income from the respondent sample using Wave 2 initial weights was \$1,000 or 1.96 percent lower than the median household income of the entire original sample households. This indicates a downward bias associated with earned income and suggests the SIPP may underestimate household income in Wave 2 due to nonresponse. The difference between these estimates is reduced to \$140 – 0.27 percent lower – and no longer statistically significant when nonresponse adjusted weights are used to calculate median income in the respondent sample, thus demonstrating that nonresponse adjustment corrected the bias associated with the household income variable.

Nonresponse adjustment also mitigated the bias associated with household earnings, receipt of welfare income, Medicaid, SNAP, and SSI participation rates, reducing the relative differences between full sample and respondent participation rates from -6.95 percent to -4.7 percent, 2.96 percent to 0.92 percent, 2.76 percent to 0.73 percent, and 3.33 percent to 0.52 percent and 6.78 percent to 4.03 percent respectively.

In a few cases, the nonresponse adjustment increases or introduces bias. For example, household poverty rate for the respondent sample using the initial weights is not significantly different from the full sample estimate. However, the nonresponse adjusted weights decrease the respondent sample estimate from 13.78 percent to 13.26 percent, thus increasing the relative difference from 0.44 to -3.35 percent. Furthermore, the estimated proportion of householders under age 25 years is 11.71 percent lower in the respondent sample compared to the full sample when computed using initial weights and further reduced to 19.31 percent lower in the respondent sample using the nonresponse adjusted weights.

Table 4. Comparison of Estimates between the Full Sample and the Wave 2 Respondent Sample

Characteristics and Key Estimates	All Sample Cases		Respondents					
	Initial Weight		Initial Weight			Nonresponse Adjusted Weight		
	Percent/ Median	Std Error	Percent/ Median	Std Error	Relative Difference	Percent/ Median	Std Error	Relative Difference
Annual household earnings	35,100	395	32,660	551	-6.95*	33,450	563	-4.7*^
Annual household income	51,130	350	50,130	417	-1.96*	50,990	380	-0.27^
Household net worth	87,570	1,681	88,000	1,875	0.49	90,840	1,614	3.73*
Households in poverty	13.72	0.23	13.78	0.27	0.44	13.26	0.27	-3.35*
Households receiving income from welfare programs	23.99	0.25	24.70	0.30	2.96*	24.21	0.29	0.92*^
Program Participation								
Medicaid	19.22	0.22	19.75	0.26	2.76*	19.36	0.24	0.73^
Medicare	31.55	0.26	33.68	0.32	6.75*	33.80	0.33	7.13*
Supplemental Nutritional Assistance Program (SNAP)	13.52	0.18	13.97	0.23	3.33*	13.59	0.22	0.52^
Social Security	32.02	0.26	34.10	0.31	6.5*	34.28	0.32	7.06*
Supplemental Security Income (SSI)	5.46	0.14	5.83	0.16	6.78*	5.68	0.16	4.03*^
Temporary Assistance for Needy Families (TANF)	0.94	0.06	0.93	0.07	-1.06	0.92	0.07	-2.13
Age of Householder								
Under 25 years	4.61	0.15	4.07	0.16	-11.71*	3.72	0.15	-19.31*
25 to 34 years	14.21	0.23	13.38	0.24	-5.84*	13.35	0.24	-6.05*
35 to 44 years	16.51	0.23	16.05	0.29	-2.79*	16.12	0.28	-2.36*
45 to 54 years	19.41	0.22	19.10	0.26	-1.6*	19.11	0.26	-1.55*
55 to 64 years	19.79	0.24	20.14	0.28	1.77*	20.30	0.28	2.58*
65 years or older	25.46	0.25	27.25	0.29	7.03*	27.41	0.30	7.66*
Asset Ownership								
Bonds	35.32	0.32	36.00	0.34	1.93*	36.26	0.35	2.66*
Minimal	64.68	0.32	64.00	0.34	-1.05*	63.74	0.35	-1.45*
Census Region								
Northeast	18.20	0.10	17.77	0.15	-2.36*	17.95	0.16	-1.37*^
Midwest	22.54	0.11	22.68	0.19	0.62	22.78	0.20	1.06
South	37.03	0.14	37.37	0.20	0.92*	37.31	0.20	0.76*
West	22.23	0.12	22.19	0.20	-0.18	21.96	0.21	-1.21
Core Based Statistical Area (CBSA) Status								
Inside principal city of a CBSA	33.32	0.29	33.60	0.34	0.84	33.41	0.33	0.27
In CBSA but not principal city	51.41	0.40	50.41	0.43	-1.95*	50.59	0.44	-1.6*^

Characteristics and Key Estimates	All Sample Cases		Respondents					
	Initial Weight		Initial Weight			Nonresponse Adjusted Weight		
	Percent/ Median	Std Error	Percent/ Median	Std Error	Relative Difference	Percent/ Median	Std Error	Relative Difference
Not in a CBSA	15.28	0.39	15.98	0.42	4.58*	16.00	0.43	4.71*
Educational Attainment of Householder								
Up to high school diploma	38.59	0.28	39.16	0.34	1.48*	38.86	0.30	0.7*^
Some college, no bachelor's degree	28.87	0.29	27.92	0.31	-3.29*	28.21	0.30	-2.29*^
Bachelor's degree or higher	32.54	0.30	32.92	0.29	1.17*	32.93	0.28	1.2*
Hispanic Origin of Householder								
Hispanic	12.30	0.17	12.21	0.20	-0.73	12.07	0.20	-1.87*
Non-Hispanic	87.70	0.17	87.79	0.20	0.1	87.93	0.20	0.26*
Household Income to Poverty Ratio								
Less than 1.75	26.99	0.26	27.44	0.30	1.67*	26.74	0.31	-0.93^
1.75 to 4.5	39.67	0.30	39.93	0.38	0.66	40.24	0.39	1.44*
Greater than 4.5	33.34	0.30	32.63	0.36	-2.13*	33.02	0.36	-0.96*^
Household Size								
1 person household	27.82	0.24	29.18	0.27	4.89*	28.62	0.26	2.88*^
2 person household	35.42	0.27	35.11	0.33	-0.88	35.22	0.34	-0.56
3 person household	15.03	0.20	14.71	0.26	-2.13*	14.91	0.27	-0.8^
4 or more person household	21.73	0.23	21.00	0.26	-3.36*	21.25	0.25	-2.21*^
Household Type								
Female householder with biological child and no spouse present	5.85	0.13	5.42	0.14	-7.35*	5.32	0.14	-9.06*
Householder 65 years or older	25.46	0.25	27.25	0.29	7.03*	27.41	0.30	7.66*
Other	68.68	0.27	67.33	0.30	-1.97*	67.27	0.32	-2.05*
Marital Status of Householder								
Married, spouse present	48.37	0.27	47.69	0.32	-1.41*	48.61	0.31	0.5^
Married, spouse absent	1.76	0.07	1.77	0.08	0.57	1.67	0.07	-5.11*
Widowed	9.67	0.18	10.64	0.22	10.03*	10.55	0.22	9.1*^
Divorced	17.06	0.27	17.41	0.28	2.05*	17.29	0.29	1.35^
Separated	2.75	0.10	2.80	0.11	1.82	2.75	0.11	0
Never married	20.40	0.27	19.70	0.29	-3.43*	19.13	0.30	-6.23*
Race of Householder								
White Only	80.94	0.20	80.97	0.24	0.04	80.91	0.23	-0.04

Characteristics and Key Estimates	All Sample Cases		Respondents					
	Initial Weight		Initial Weight			Nonresponse Adjusted Weight		
	Percent/ Median	Std Error	Percent/ Median	Std Error	Relative Difference	Percent/ Median	Std Error	Relative Difference
Black Only	11.92	0.14	11.77	0.17	-1.26	11.79	0.17	-1.09
Asian Only	4.44	0.13	4.51	0.14	1.58	4.57	0.14	2.93*
Other	2.70	0.11	2.74	0.13	1.48	2.73	0.14	1.11
Sex of Householder								
Male	47.45	0.33	47.55	0.39	0.21	47.60	0.38	0.32
Female	52.55	0.33	52.45	0.39	-0.19	52.40	0.38	-0.29
Tenure								
Owner	64.58	0.21	65.17	0.26	0.91*	65.63	0.23	1.63*
Renter, no government subsidy	30.79	0.23	29.83	0.28	-3.12*	29.56	0.24	-3.99*
Renter, receives government subsidy	4.63	0.11	5.01	0.14	8.21*	4.81	0.13	3.89*^
Urban/Rural Status								
Urban	80.76	0.27	80.30	0.29	-0.57*	80.20	0.30	-0.69*
Rural	19.24	0.27	19.70	0.29	2.39*	19.80	0.30	2.91*
Within PSU Strata								
Low income	36.66	0.18	37.53	0.27	2.37*	37.10	0.26	1.2*^
Non-low income	63.34	0.18	62.47	0.27	-1.37*	62.90	0.26	-0.69*^

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2014 Panel.

* Indicates full sample and respondent estimates are significantly different at the $\alpha=0.10$ level.

^ Indicates nonresponse adjustments helped to reduce the bias. The relative difference for the nonresponse adjusted estimate is either no longer significant (relative difference was significant for the initial weighted estimate) or the difference is smaller than the relative difference using only the initial weight at the 90 percent confidence level.

4.4 Modeling Wave 2 Response Propensities

Odds ratios associated with each predictor variable in the logistic regression model are presented in Table 5. The first level of each explanatory variable is treated as the reference level and other categories of the variable are compared to the reference category. Odds ratios greater than 1 indicate the categories are more likely to be respondents in Wave 2 compared to the reference level.

Households with older reference persons had at least 24.7 percent greater odds of responding in Wave 2 compared to households with the reference persons younger than 25 years and households consisting of two or more members were less likely to respond compared to single person households.

Households who possessed bonds or other investments had 15.3 percent higher odds of responding than those who did not own these types of assets. Households whose reference persons had a bachelor's or more advanced degree were more likely to be interviewed in Wave 2 compared to households whose reference person had up to a high school diploma, whereas households whose householders persons had some college degree below a bachelor's had lower odds of responding compared to households whose householders were in the reference education category.

Furthermore, households where at least one member received welfare benefits in 2013 had 28 percent greater odds of responding to the survey in the second Wave of interviews compared to households where no one received any benefits and households in rural areas were more likely to be interviewed compared to households located in urban areas. The estimated R-indicator for the model is 0.90, suggesting the respondent sample is representative of the Wave 1 respondent sample.

Table 5. Odds Ratios for Logistic Regression Modeling Wave 2 Response Propensities

Model Variables	Odds Ratio	90 percent Confidence Interval
Age of Householder		
Under 25 years	1.000†	
25 to 34 years	1.247*	(1.102,1.411)
35 to 44 years	1.402*	(1.223,1.606)
45 to 54 years	1.456*	(1.293,1.639)
55 to 64 years	1.585*	(1.398,1.797)
65 years or older	1.652*	(1.396,1.956)
Asset Ownership		
Minimal	1.000†	
Bonds	1.153*	(1.085,1.225)
Educational Attainment of Householder		
Up to high school diploma	1.000†	
Some college, no bachelor's degree	0.916*	(0.859,0.977)
Bachelor's degree or higher	1.150*	(1.06,1.247)
Household Income to Poverty Ratio		
Less than 1.75	1.000†	
1.75 to 4.5	0.989	(0.918,1.066)
Greater than 4.5	0.857*	(0.788,0.933)
Household Size		
1 person household	1.000†	
2 person household	0.779*	(0.724,0.837)
3 person household	0.793*	(0.722,0.87)
4 or more person household	0.742*	(0.686,0.803)

Model Variables	Odds Ratio	90 percent Confidence Interval
Medicare Enrollment Status		
At least one household member was enrolled in Medicare	1.000‡	
No household member was enrolled in Medicare	0.815*	(0.732,0.907)
Receipt of Welfare Income		
Did not receive welfare income	1.000‡	
Received welfare income	1.280*	(1.197,1.369)
Tenure		
Owner	1.000‡	
Renter, no government subsidy	0.933*	(0.873,0.997)
Renter, receives government subsidy	1.202*	(1.047,1.381)
Urban/Rural Status		
Urban	1.000‡	
Rural	1.104*	(1.035,1.176)

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2014 Panel.

‡ Indicates reference level.

* Indicates estimate is significantly different from the reference group at the $\alpha=0.10$ level.

4.5 Level of Effort Analysis

The level of effort analysis examined how various SIPP key estimates in calendar year 2014 differed between early and late responders. Original sample households that were interviewed in Wave 2 were designated early or late responders depending on the number of contacts they required to complete the survey. Estimates of earned income, household net worth, poverty rates and program participation rates computed using SIPP 2014 Wave 2 data and Wave 2 initial weights for early and late respondent households are provided in Table 6. All estimates were significantly different between the two groups except for poverty and SNAP enrollment rates.

Late responding households had an annual median earned household income of \$50,860 in 2014, slightly lower than twice the annual median earned income in early responding households. Late respondents also had a higher total median household income compared to early respondents but their median household net worth was \$14,860 lower than that of early responders.

The proportions of early respondent households receiving Medicaid, TANF or income from at least one welfare program were significantly lower than those of late respondent households. The higher Medicaid participation among late respondents, though inconsistent with their

higher earned and total incomes, may be explained by the fact that early responding households have higher net worth, older reference persons, and are more likely to own their homes, compared to late responding households. There are twice as many householders age 65 or older in early responding households (34 percent) compared to late responding households (17.2 percent). Early responders also had higher participation in Medicare, Social Security and SSI – programs with sizeable recipients age 65 or older¹³ – compared to late responders.

Table 6. Comparing Key Wave 2 Estimates Between Wave 2 Early Respondents and Late Respondents

Characteristics and Key Estimates	Early Respondents		Late Respondents		Chi-Square Statistic (df)	
	Percent/ Median in Dollars	Standard Error	Percent/ Median in Dollars	Standard Error		
Annual household earnings	26,450	642	50,860	997	-	*
Annual household income	50,090	428	61,980	946	-	*
Household net worth	101,000	2,725	86,140	2,651	-	*
Households in poverty	12.75	0.29	11.91	0.46	-	
Households receiving income from welfare programs	27.79	0.38	32.21	0.58	-	*
Program Participation						
Medicaid	23.70	0.35	28.10	0.56	-	*
Medicare	42.84	0.43	25.27	0.62	-	*
Supplemental Nutritional Assistance Program (SNAP)	14.86	0.30	15.41	0.44	-	
Social Security	41.98	0.40	24.53	0.62	-	*
Supplemental Security Income (SSI)	7.08	0.24	5.77	0.30	-	*
Temporary Assistance for needy Families (TANF)	0.91	0.08	1.44	0.16	-	*
Age of Householder						
Under 25 years	2.86	0.16	3.70	0.25		
25 to 34 years	11.09	0.26	16.23	0.49		
35 to 45 years	13.60	0.32	21.18	0.51	697.2(5)	*
45 to 54 years	17.38	0.35	22.31	0.54		
55 to 64 years	21.08	0.32	19.38	0.52		
65 years or older	33.99	0.36	17.20	0.53		
Tenure						
Owner	67.33	0.31	64.05	0.58		
Renter, no government subsidy	27.72	0.32	31.77	0.58	42.00(2)	*
Rented, receives government subsidy	4.95	0.18	4.18	0.23		

¹³ Medicare enrollees are comprised of persons age 65 or older and disable persons younger than 65. Seventy-one percent of Social Security benefit recipients and 25.5 percent of SSI benefit recipients in December 2014 were persons age 65 or older (Office of Research, Evaluation and Statistics, 2015).

Characteristics and Key Estimates	Early Respondents		Late Respondents		Chi-Square Statistic (df)
	Percent/Median in Dollars	Standard Error	Percent/Median in Dollars	Standard Error	
Within PSU Strata					
Low Income	37.76	0.36	36.98	0.55	1.175(1)
Non-Low Income	62.24	0.36	63.02	0.55	

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2014 Panel.

* Indicates estimates between early and late responder households are significantly different at the $\alpha=0.10$ level.

The usefulness of the comparison between early and late respondents hinges on whether the late respondents actually resemble the nonresponding households. Ultimately, many demographic and geographic characteristics were found to be different between late respondent and nonresponding households and are shown in Table 7. These included household type, household size, within PSU strata, age, education, Hispanic origin, and race of the householder. No differences were found between late responding and nonresponding households on tenure, region, sex, and marital status of householder.

Table 7. Comparing Wave 1 Demographic and Frame Characteristics Between Wave 2 Nonrespondents and Late Respondents

Characteristics	Nonrespondents		Late Respondents		Chi-Square Statistic (df)
	Percent/Median in Dollars	Standard Error	Percent/Median in Dollars	Standard Error	
Age of Householder					
Under 25 years	6.30	0.32	5.03	0.29	54.93(5) *
25 to 34 years	16.78	0.52	16.95	0.49	
35 to 44 years	17.95	0.50	21.23	0.49	
45 to 54 years	20.36	0.44	22.35	0.54	
55 to 64 years	18.72	0.54	18.49	0.53	
65 years or older	19.89	0.53	15.94	0.52	
Census Region					
Northeast	19.53	0.41	19.93	0.51	0.7112(3)
Midwest	22.14	0.53	21.75	0.56	
South	35.98	0.54	35.54	0.63	
West	22.35	0.51	22.79	0.51	
Core Based Statistical Area					
Inside principal city of a CBSA	32.44	0.65	36.20	0.57	17.11(2) *
In CBSA but not principal city	54.49	0.71	51.91	0.62	
Not in a CBSA	13.07	0.53	11.89	0.54	

Characteristics	Nonrespondents		Late Respondents		Chi-Square Statistic (df)	
	Percent/ Median in Dollars	Standard Error	Percent/ Median in Dollars	Standard Error		
Educational Attainment of Householder						
Up to high school diploma	36.82	0.66	36.61	0.65		
Some college, no bachelor's degree	31.82	0.57	28.84	0.58	15.50(2)	*
Bachelor's degree or higher	31.36	0.67	34.55	0.60		
Hispanic Origin of Householder						
Hispanic	12.58	0.42	15.08	0.53	12.17(1)	*
Non-Hispanic	87.42	0.42	84.92	0.53		
Household Size						
1 person household	23.60	0.59	21.70	0.52		
2 person household	36.37	0.67	31.80	0.55	50.74(3)	*
3 person household	16.02	0.45	17.31	0.53		
4 or more person household	24.00	0.57	29.18	0.60		
Household Type						
Female householder with biological child and no spouse present	7.21	0.31	7.35	0.32	33.63(2)	*
Householder 65 years or older	19.89	0.53	15.94	0.52		
Other	72.90	0.61	76.70	0.58		
Marital Status of Householder						
Married, spouse present	50.50	0.57	49.53	0.53		
Married, spouse absent	1.72	0.17	1.76	0.18		
Widowed	6.64	0.31	6.61	0.35	4.133(5)	
Divorced	15.95	0.56	16.82	0.56		
Separated	2.61	0.23	3.00	0.20		
Never Married	22.59	0.48	22.27	0.51		
Race of Householder						
White Only	80.83	0.50	76.73	0.62		
Black Only	12.38	0.35	14.63	0.41	31.29(3)	*
Asian Only	4.20	0.29	5.75	0.39		
Other	2.59	0.22	2.90	0.25		
Sex of Householder						
Male	47.16	0.66	46.85	0.71	0.1005(1)	
Female	52.84	0.66	53.15	0.71		
Tenure						
Owner	62.74	0.64	62.79	0.59		
Renter, no government subsidy	33.78	0.62	33.10	0.57	3.940(2)	
Renter, receives government subsidy	3.48	0.23	4.11	0.22		
Urban/Rural Status						
Urban	82.20	0.50	84.40	0.59	8.304(1)	*

Characteristics	Nonrespondents		Late Respondents		Chi-Square Statistic (df)
	Percent/ Median in Dollars	Standard Error	Percent/ Median in Dollars	Standard Error	
Rural	17.80	0.50	15.60	0.59	
Within PSU Strata					
Low income	33.94	0.57	36.98	0.55	12.43(1) *
Non-low income	66.06	0.57	63.02	0.55	

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2014 Panel.

* Indicates estimates between Nonresponders and Late responders are significantly different at the $\alpha=0.10$ level.

4.6 Comparing Wave 2 Estimates to Benchmarks

Findings from comparing various SIPP person and household level final weighted estimates – computed from all original and spawned households that were interviewed in Wave 2 – to corresponding administrative data sources and estimates from the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC) are summarized in Table 8. The statistics examined include: annual median household income by race and Hispanic origin of the householder; percent of persons in poverty by race and Hispanic origin, sex, and age; number of persons enrolled in Medicaid, Medicare, SNAP, Social Security, SSI and TANF; and average monthly Social Security and SSI income among respective program recipients. The table displays benchmarks and their margins of error when available, SIPP estimates and their standard errors, differences and relative differences between the benchmark and SIPP estimates.

The reference period – duration for which an estimate is computed – depends on the benchmarks available. Median household income and poverty rates are annual estimates for the entire 2014 calendar year. Medicaid, SNAP, Social Security and SSI statistics are monthly counts of persons who received benefits from these programs in December 2014. The Medicare estimate is the average monthly number of persons that participated in the program during the 2014 calendar year.

SIPP 2014 annual median household income (\$53,700) did not significantly differ from CPS ASEC annual income of \$53,657. The median household income from both surveys also did not differ by race and Hispanic origin except among households that had White, non-Hispanic householders where the SIPP estimate was 2.8 percent lower than the CPS ASEC benchmark. The SIPP estimated percentage of persons in poverty during 2014, 14.61 percent, was also not significantly different from the CPS ASEC estimate of 14.8 percent. However, examining poverty rates across age groups, race and Hispanic origin revealed differences among Black persons, persons age 18 to 64 years, and persons age 65 years or older. SIPP poverty rates were 11 percent lower, 4.15 percent higher and 32.7 percent lower than the CPS estimates for the three

groups respectively. The poverty rate for persons age 65 or older was also the highest absolute relative difference – 32.7 percent – between any SIPP estimate and benchmark.

The SIPP underestimated overall participation in Medicaid, Medicare, Social Security and TANF but overestimated participation in SSI compared to program sources. The SIPP estimate counts of Medicaid, Medicare, Social Security and TANF recipients were 11.71 percent, 1.19 percent, 5.96 percent and 31.26 percent lower than benchmarks respectively. The SIPP estimated SSI enrollees were 6.85 percent higher than the estimates produced by the Social Security Administration.

The number Social Security beneficiaries in December 2014 computed from the SIPP also differed from benchmarks published in the 2015 Social Security statistical supplement by sex and among persons age 62 years¹⁴ or older. SIPP estimates were 4.01 percent, 7.6 percent, and 6.9 percent lower than benchmarks among males, females, and persons age 62 or older respectively. The SIPP estimated average monthly Social Security income in the same month was \$203 (16.71 percent) higher than the benchmark among all recipients, 16.11 percent higher among males, and 16.96 percent higher among females.

While the SIPP overestimated the number of SSI enrollees by 6.85 percent, participant counts by age groups was only significantly higher (9.06 percent) among recipients age 18 to 64 years old. The SIPP estimated average monthly SSI income was not significantly different from the Social Security Administration published value but was \$59 lower among persons under 18 years, and \$34 higher among persons 65 years or older.

It is important to note that the SIPP sample universe and the population enrolled in the different government programs are not equivalent. The SIPP sample universe is restricted to civilian noninstitutionalized persons residing United States, i.e. the 50 states and the District of Columbia (Washington D.C.). While program participation benchmark counts for Medicaid and Medicare in Table 8 are also restricted to the same geographical region as the SIPP sample universe,¹⁵ they include institutionalized persons. Social Security and SSI participation benchmark counts and average monthly benefits include all persons in the United States and in eligible U.S. territories and also institutionalized persons.

¹⁴ The earliest age persons can begin receiving social security retirement benefits is age 62.

¹⁵ The Centers for Medicare and Medicaid also produce counts of [Medicare](#) and [Medicaid](#) participants that include recipients residing in U.S territories.

Table 8. Comparing SIPP 2014 Wave 2 Key Estimates to Benchmarks from Administrative Data and Estimates from the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC)

Characteristic and Subgroups	Benchmark	Benchmark Margin of Error	SIPP Estimate	SIPP Standard Errors	Relative Difference (percent)
Annual Median Income (in Dollars)					
All households	53,657	645	53,700	549	0.08
Race and Hispanic Origin					
White Only	60,256	605	58,570	603	-2.8*
Black Only	35,398	758	35,570	979	0.49
Asian Only	74,297	3,466	75,300	2,809	1.35
Hispanic of any race	42,491	848	44,410	1,092	4.52
Poverty Rates (Percentages)					
All persons	14.80	0.30	14.61	0.25	-1.28
Age					
Under 18 years	21.10	0.50	21.57	0.58	2.23
18 to 64 years	13.50	0.30	14.06	0.24	4.15*
65 years or older	10.00	0.40	6.73	0.31	-32.7*
Race and Hispanic Origin					
White Only	10.10	0.30	10.63	0.30	5.25
Black Only	26.20	0.90	23.32	0.89	-10.99*
Asian Only	12.00	1.20	10.52	0.85	-12.33*
Hispanic of any race	23.60	0.80	23.45	0.79	-0.64
Sex					
Male	13.40	0.30	13.33	0.29	-0.52
Female	16.10	0.30	15.84	0.29	-1.61
Social Security Participation					
All Recipients	59,007,158	-	55,490,000	455,400	-5.96*
Age ¹					
Under 62 years	11,756,072	-	11,560,000	392,600	-1.67
62 years or older	47,185,114	-	43,930,000	274,500	-6.90*
Sex					
Male	26,732,874	-	25,660,000	271,700	-4.01*
Female	32,274,284	-	29,820,000	295,500	-7.60*
Average Monthly Social Security Income (in Dollars)					
All Recipients	1,215	-	1,418	6.88	16.71*
Sex					
Male	1,372	-	1,593	10.30	16.11*
Female	1,085	-	1,269	8.06	16.96*

Characteristic and Subgroups	Benchmark	Benchmark Margin of Error	SIPP Estimate	SIPP Standard Errors	Relative Difference (percent)
Supplemental Security Income (SSI) Participation					
All Recipients	8,335,704	-	8,907,000	288,000	6.85*
Age					
Under 18 years	1,299,761	-	1,223,000	97,800	-5.91
18 to 64 years	4,913,072	-	5,358,000	205,900	9.06*
65 years or older	2,122,871	-	2,326,000	128,800	9.57
Average Monthly Supplemental Security Income (in Dollars)					
All Recipients	532	-	530	7.98	-0.38
Age					
Under 18 years	633	-	574	16.47	-9.32*
18 to 64 years	551	-	549	9.97	-0.36
65 years or older	427	-	461	12.80	7.96*
Participation in Other Programs					
Medicaid	69,919,366	-	61,730,000	822,600	-11.71*
Medicare	52,838,388	-	52,210,000	295,100	-1.19*
Supplemental Nutrition Assistance Program (SNAP)	46,252,074	-	37,080,000	751,200	-19.83*
Temporary Assistance for Needy Families (TANF)	3,209,251	-	2,206,000	159,900	-31.26*

Sources: U.S. Census Bureau, Survey of Income and Program Participation, 2014 Panel.

U.S. Census Bureau Current Population Survey 2015 Annual Social and Economic Supplements.

The Centers for Medicaid & Medicare Services (CMS) Program Statistics, 2014 Medicare Enrollment Section.

The Center for Medicaid and Children's Health Insurance Program (CHIP) Services, Monthly Medicaid & CHIP Application, Eligibility Determination and Enrollment Reports & Data, Monthly Enrollment, January 2015.

Social Security Administration, Social Security Annual Statistical Supplement, 2015.

U.S Department of Agriculture, Supplemental Nutrition Assistance Program (SNAP) Monthly State Participation and Benefit Summary – Public Data, Fiscal year 2015.

U.S Department of Health & Human Services, Office of Family Assistance, Temporary Assistance for Needy Families (TANF) Caseload Data 2014.

¹ Social Security participation by age benchmarks obtained from Tables 5A.1 to 5A.11 of the 2015 Social Security Annual Statistical Supplements exclude disabled persons age 60 to 64 years.

* Indicates SIPP estimates are significantly different from benchmarks at the $\alpha=0.10$ level.

Note regarding benchmark analysis in Wave 1 of the SIPP 2014 Panel: SNAP and TANF estimates reported in the SIPP 2014 Wave 1 nonresponse bias analysis are significantly higher than those published in Table 8. This is because SIPP re-released Wave 1 files in September 2017 which included changes to beginning and ending months of SNAP and TANF receipt spells, whereas all estimates in the Wave 1 nonresponse bias analysis were computed using the original SIPP Wave 1 data published in March 2017. The correct estimates for the number of persons who receive SNAP and TANF in December 2013 are 36,540,000 and 2,543,000 respectively. Both numbers are still significantly lower than the benchmarks and hence do not alter the conclusions on the report.

The Medicaid benchmark documented in the SIPP 2014 Wave 1 nonresponse bias report is also significantly higher than the benchmark published in Wave 2 because it represents a different statistic. The Wave 1 Medicaid benchmarks corresponds to the unduplicated number of persons who were enrolled in Medicaid in the 2013 fiscal year and was obtained from the 2014 edition of the Center of Medicaid and Medicare Statistics Reference Booklet which was discontinued in 2016 and replaced with the Center of Medicaid and Medicare Program Statistics. The Wave 2 Medicaid benchmark corresponds to the number of persons enrolled in Medicaid at any point in December and were obtained from Center for Medicaid and CHIP Services.

5. Discussion and Conclusions

This analysis employed different techniques to investigate the potential for nonresponse bias in SIPP 2014 Wave 2 data including: comparing weighted response rates across subgroups of the sample; examining key estimates, frame and demographic characteristics among full sample, respondents, and nonrespondents; modeling Wave 2 response propensities using Wave 1 data, a level of effort analysis, and benchmarking. Some of the methods identified variables correlated with nonresponse while others provided estimates of nonresponse bias for specific estimates and the effect of noninterview adjustments on these statistics.

Weighted response rates differed across subgroups of the same characteristics and the subgroup response rates were also significantly different from the Wave 2 unit response rate, implying there is potential bias due to nonresponse for statistics associated with these characteristics. Comparisons between nonrespondent and respondent household estimates in Section 4.2 and response propensities logistic regression model supported these findings. While the R-indicator from the logistic regression model indicates the Wave 2 respondent households are representative of Wave 1 respondent households, it depends on the response propensities predicted by the model. The R-indicator also provides no information on how representative the Wave 2 respondent households are of the original selected SIPP sample consisting of both

Wave 1 respondents and nonrespondents. The aforementioned analyses were conducted using initial weights and did not account for the effect of the noninterview adjustment in mitigating nonresponse bias.

Comparing relative differences between initial weighted full sample estimates and respondent estimates computed using noninterview adjusted weights demonstrates that the noninterview adjustment is effective in reducing nonresponse bias associated with some of these estimates. In Table 4, 41 of the 60 initial weighted respondent statistics significantly differed from those of the full sample. After nonresponse adjusted weights are used to calculate the respondent household estimates, about 20 of them either are no longer significantly different from the full sample estimates or had significantly lower relative differences: only 7¹⁶ estimates had relative differences greater than 5 percent. Some of the variables that remained biased after incorporating noninterview adjusted weights – including householder age and Hispanic origin – are utilized in the second stage adjustments of the SIPP weighting procedure and may hence the biases associated with them may also be reduced during the process.

Early and late respondents differed on many key estimates, which would indicate the presence of nonresponse bias if the late respondents were similar to nonrespondents. However, upon investigation late responders turned out to be different from nonrespondents for most of the characteristics examined.

Although results from Table 4 suggested the SIPP may underestimate poverty rates, SIPP income and poverty rate estimates did not differ from the 2015 CPS ASEC estimates demonstrating that the combination of noninterview and second stage adjustments were effective in correcting the bias. Nonetheless, the SIPP underestimated participation in Medicaid, Medicare, SNAP, Social Security and TANF but overestimated SSI participation among all households that responded to the survey in Wave 2. Although benchmarking utilizes data from all – both original and spawned – households interviewed in Wave 2, and reveals that some of the SIPP estimates may be biased, we cannot infer that nonresponse is solely responsible for these differences. The differences in estimates may be due to differences in measurement procedures, survey design, or interpretation of the survey questions. They may also result from differences in the target populations¹⁷. For example, Medicaid and Medicare enrollment benchmarks are not grouped by institutionalization status, whereas the SIPP universe excludes all military personnel and institutionalized civilians. Some enrollment

¹⁶ The magnitude of relative differences associated with householders who were married with spouse absent (-5.11 percent) and householders age 25 to 34 years (-6.05 percent) were not significantly different from 5 percent.

¹⁷ The SIPP and CPS ASEC survey have the same sample universe – civilian noninstitutionalized population residing in the United States.

statistics like Social Security receipt also include persons in U.S. territories that are excluded from the SIPP sample.

Combining the different methods in our nonresponse study, we conclude that noninterviewed adjusted weights mitigates the biases associated with some of SIPP's key estimates and while some statistics still remain biased after the noninterview adjustments, there is no strong evidence of nonresponse bias in the second wave of the 2014 SIPP.

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